

SECTION 15181

STEAM AND CONDENSATE PIPING

When editing to suit project, author shall add job-specific requirements and delete only those portions that in no way apply to the activity (e.g., a component that does not apply). To seek a variance from applicable requirements, contact the Engineering Standards Manual (ESM) Mechanical POC.

When assembling a specification package, include applicable specifications from all Divisions, especially Division 1, General Requirements.

Delete information within "stars" during editing.

Coordinate this specification with Mechanical Standard Drawings ST-D3020-1 through ST-D3020-4 and Civil Standard Drawings ST-G3040-1. Refer to specification 02554 for site steam and condensate piping system.

Specification developed for ML-3 / ML-4 projects. For ML-1 / ML-2, additional requirements and QA reviews are required.

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Building steam and condensate service piping, fittings, valves, etc. downstream of the first steam shutoff valve inside building.

1.2 SUBMITTALS

- A. Submit the following in accordance with Section 01330, Submittal Procedures:
 - 1. Catalog data on pipe, pipe fittings, and valves.
 - 2. Certification of welders.

1.3 QUALITY ASSURANCE

- A. Comply with ASME B31.9, Building Services Piping.

PART 2 PRODUCTS

Piping, fittings, and materials described herein are generally restricted to a maximum 150 psig working steam pressure (WSP). For other pressure and temperature ratings, additional specification and restrictions may be required.

2.1 PRODUCT OPTIONS AND SUBSTITUTIONS

- A. Alternate products may be accepted; follow Section 01630, Product Options and Substitutions.

2.2 STEAM PIPING, ABOVE GRADE (150 PSIG MAXIMUM)

- A. Pipe: Black steel, Schedule 40, ASTM A53, ERW, Grade B, or A106, Grade B (welded pipe).
- B. Pipe: Black steel, Schedule 80, ASTM A53, ERW, Grade B, or A106, Grade B (threaded pipe).
- C. Fittings (threaded): Malleable iron, ASME B16.3, Class 150 for pressures of 15 psig or less, Class 300 for pressures above 15 psig. NOTE: Eccentric threaded fittings are not available in malleable iron. Use steel butt welded eccentric fittings or threaded carbon steel, ASTM A234, reducing eccentric swage nipples, Grinnell Co.
- D. Fittings (socket weld): Forged steel, ASTM A105, Class 3000.
- E. Fittings (butt weld): Steel, ASTM A234, Grade B, Schedule 40 or 80 (to match piping).
- F. Joints: Threaded for pipe sizes up to 2 inches, welded or flanged for pipe sizes above 2 inches.

2.3 CONDENSATE PIPING, ABOVE GRADE (150 PSIG MAXIMUM)

- A. Pipe: Black steel, Schedule 80, ASTM A53, ERW, Grade B, or A106, Grade B.
- B. Fittings (threaded): Malleable iron, ASME B16.3, Class 150 for pressures of 15 psig or less, Class 300 for pressures above 15 psig. NOTE: Eccentric threaded fittings are not available in malleable iron. Use steel butt welded eccentric fittings or threaded carbon steel, ASTM A234, reducing eccentric swage nipples, Grinnell Co.
- C. Fittings (socket weld): Forged steel, ASTM A105, Class 3000.
- D. Fittings (butt weld): Steel ASTM A234, Grade B, Schedule 80.
- E. Joints: Threaded for pipe sizes up to 2 inches, welded or flanged for pipe sizes above 2 inches

2.4 FLANGES, FOR PIPE SIZES OVER 2 INCHES

- A. Forged steel, ASTM A105, Grade 1, ANSI Class 150, weld neck, raised face, dimensions per ANSI B16.5.

2.5 GASKET MATERIAL

- A. Pressures above 100 psig: Flexitallic, non-asbestos, CG style
- B. Pressures 100 psig or less: Sheet gasket, branded material, 1/16 inch thick, non-asbestos, suitable for steam service up to 500 degrees F. Klinger, No. C4401.

2.6 BOLTS, STUDS AND NUTS

- A. Bolts/Studs: Alloy steel, ASTM A193, Grade B7.

- B. Nuts: Alloy steel, ASTM A194, Grade 2H.

2.7 STEEL GATE VALVES (THREADED ENDS)

- A. Manufacturer: Vogt, Series 12111.
- B. Forged steel, ASTM A105, Grade 2, Class 800, steam service, 500 degrees F at 1595 psig, rising stem, threaded ends, hard faced seat and disc.

2.8 STEEL GATE VALVES (FLANGED OR WELDED ENDS)

- A. Manufacturer: Powell, Figure 1503N.
- B. Cast carbon steel, ASTM A216, Grade WCB, Class 150, steam service, 500 degrees F at 170 psig, rising stem, flanged or welded ends to suit piping, hard-faced seat and disc.

2.9 STEEL GLOBE VALVES (THREADED ENDS)

- A. Manufacturer: Vogt, Series 12141.
- B. Forged steel, ASTM A105, Grade 2, Class 800, steam service, 500 degrees F at 195 psig, rising stem, threaded ends, hard-faced seat and disc.

2.10 STEEL GLOBE VALVES (FLANGED OR WELDED ENDS)

- A. Manufacturer: Powell, Figure 1531.
- B. Cast carbon steel, ASTM A216, Grade WCB, Class 150, steam service, 500 degrees F at 170 psig, rising stem, flanged or welded ends to suit piping, hard-faced seat and disc.

2.11 BRONZE GATE VALVES (THREADED ENDS)

- A. Manufacturer: Nibco, T-113.
- B. Bronze, ASTM B62, Class 125, steam service, 350 degrees F at 125 psig, screw-in bonnet, rising stem, solid wedge, threaded ends.

2.12 BRONZE GLOBE VALVES (THREADED ENDS)

- A. Manufacturer: Nibco, T211.
- B. Bronze, ASTM B62, Class 125, steam service, 350 degrees F at 125 psig, screw-in bonnet, integral seat, renewable seat and disc, threaded ends.

2.13 BRONZE CHECK VALVES (THREADED ENDS)

- A. Manufacturer: Nibco, T143.
- B. Bronze, ASTM B62, Class 125, steam service, 350 degrees F at 125 psig, horizontal swing.

2.14 STEEL CHECK VALVES (THREADED ENDS)

- A. Manufacturer: Vogt, No. 574.
- B. Forged steel, ASTM A105, steam service, 350 degrees F at 125 psig, horizontal swing.

2.15 STRAINERS

- A. Pressures 15 psig or less: "Y" Type, rated for 125 psig steam, service to 350 degrees F, 20 mesh stainless steel screens, bronze body, ASTM B62 with blowoff gate valve and plug.
- B. Pressures above 15 psig: "Y" Type, rated for 250 psig steam, 20 mesh stainless steel screens, steel body, ASTM A216 with blowoff gate valve and plug.

PART 3 EXECUTION

3.1 PREPARATION

- A. Ream pipe and tube ends. Remove burrs.
- B. Remove scale and dirt on inside and outside of piping before assembly.
- C. Prepare piping connections to equipment with flanges or unions.
- D. Keep open ends of pipe free from scale and dirt. Whenever work is suspended during construction, protect open ends with temporary plugs or caps.
- E. After completion, fill, clean, and chemically treat systems. Refer to Section 15185, Chemical Water Treatment.

3.2 INSTALLATION

- A. Install in accordance with manufacturers' instructions.
- B. Route piping in orderly manner, plumb and parallel to building structure, and maintain gradient.
- C. Install piping to conserve building space and not interfere with use of space.
- D. Sleeve and caulk pipes penetrating exterior walls or interior bearing walls. Provide waterproof installation for exterior walls. Provide UL/FM approved through-penetration firestop system when penetrating fire-rated barriers (i.e., walls, floors, etc).
- E. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
- F. Provide clearance for installation of insulation and access to valves and fittings.
- G. Provide safe access or remote operators where valves and fittings are not exposed or installed over 7 feet in height above finished floor.

- H. Slope steam and condensate piping 1 inch in 40 feet (0.25 percent) in direction of flow.
- I. Install valves with stems upright or horizontal, not inverted.
- J. Use threaded bronze valves and strainers in piping up to 2 inches, for design pressures 15 psig or less.
- K. Use threaded steel valves and strainers in piping up to 2 inches, for design pressures above 15 psig.
- L. Use welded or flanged steel valves and strainers in piping above 2 inches.
- M. Provide eccentric reducers, flat on bottom, in horizontal runs of steam and condensate piping.
- N. Provide globe valves for throttling, bypass, or manual flow control services.
- O. Provide gate valves inside building to isolate equipment or part of piping system.
- P. Connect steam and condensate branch lines into top of main or at a 45-degree angle from top of main.
- Q. Label Piping in accordance with Section 15075.
- R. Pressure test piping in accordance with Section 15992.
- S. Support piping in accordance with Section 15060.
- T. Insulate piping in accordance with Section 15080.

END OF SECTION

Do not delete the following reference information:

FOR LANL USE ONLY

This project specification is based on LANL Master Construction Specification Rev. 4, dated September 2, 2004.